Global Precipitation Measurement (GPM) mission

GPM Data and PPS Status

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GPM PMM Science Team Meeting

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Reprocessing Background

- **For the first time in reprocessing since 1997 the data product versions are different for radiometer and radar.**
- **By custom the reprocessing cycle was always identified by the data product version. However, we are in the 5th reprocessing cycle since GPM launch.**
- **Almost all radiometer products are at data product version V05**
- **All radar based products are at data product version V06**
  - Initially radar processing was started at V05 and L1B is still at V05
  - JPST determined there was an issue with the V05 radar data product (which had already begun reprocessing).
  - JPST determined the issue was important enough to retract V05 radar products, fix the issue and then reprocess
  - Radar V06 is the resultant reprocessed data set
  - Combined then also needed to adjust to the radar correction
- **IMERG is at data product V06**

Current Reprocessing Versions

- **All L1C radiometer products are at V05 except:**
  - SSMI F10-F15 which are at V06A
  - SSMI F8 which is at V06B
  - X-cal team found an issue with the original V05 and this was corrected but GPROF NOT reprocessed
- **All radiometer L2 and L3 GPROF products are at V05**
- **Radar Products**
  - 1B Ku and Ka at V05
  - L2 Ku/Ka/DPR at V06
  - L3 Ku/Ka/DPR at V06
- **Combined Products both L2 and L3 are at V06**
- **CSH and SLH latent heating both L2 and L3 are at V06**
- **IMERG at V06 (*George Huffman will discuss this major version)***
  - Early, Late and Final are all at V06 back to June 2000
  - TIF version also at V06 as they are produced from the base IMERG

TRMM Reprocessing Background

- **A major objective of GPM was the use of same (similar) GPM algorithms on TRMM data (and partner constellations) back to 1997 data**
- **TRMM as part of phase F activities (but funded by the GPM mission) was authorized to undertake a TRMM version 8 reprocessing**
  - TRMM version 8 reprocessing was to use GPM algorithms and be consistent with GPM products
  - As part of the version 8 reprocessing TRMM data were reprocessed with GPM based V05/V06 algorithms
  - This last TRMM reprocessing brought TRMM era data into the GPM data suite and also changed the naming convention to that used in GPM products rather than the old TRMM naming convention.
  - TRMM products created in HDF5
  - As part of the GPM V05/V06 data suite, all GPM reprocessing will always start with at least the TRMM period.
  - Effective with GPM V07 GPROF will be extended back to 1987 and the GPM data suite will start with 1987.

TRMM Data Product Version

- **All GPROF 2A-CLIM L2/L3 data are at V05**
- **TRMM radar**
  - L1B at V05
  - PR KU L2/L3 at V06
    - Uses a version of the GPM Ku algorithm
    - Has the same format at GPM Ku
- **Combined L2/L3 at V06**
- **SLH and CSH L2/L3 at V06**
- **IMERG at V06 starting in June 2000**
  - No 4KM IR data product available before January 2000
  - Needed the early 2000 data to spinup “statistically” the June 2000
  - Reprocessing made possible because of change of ancillary data used in morphing

PPS/Science Team Affiliated Products

- **Partnered with Univ of Utah/Texas A&M at Corpus Christi, PPS produces Precipitation Features products that are serviced by the Universities**
  - GPM era PF products are at V06
  - TRMM era PF products are at V06
  - All products back to 1998 to the present have been reprocessed and are available at TAMU-CC
  - PPS produces
    - GPM instrument based PF (includes LH)
    - TRMM instrument based PF (includes LH and LIS)
    - Constellation based PF (back to the TRMM era through the GPM era)
  - http://atmos.tamucc.edu/trmm

PPS/Science Team Affiliated Products -2

- **Partnered with the UWash we produce a KU based convective/statiform subset suite**
- **North America, South America, Africa complete for V06. South Asia region being processed. Other areas have not yet begun at V06**
- **These products are served by the University of Washington**
  - The NASA GPM 2AKu product is provided in bins along the slant range of the antenna beam. In the University of Washington database, these data in radar coordinates are geolocated and interpolated into a three-dimensional Cartesian grid and stored for analysis. From this dataset it is possible to identify structures of reflectivity echoes that satisfy certain criteria. Five types of echo objects are identified: isolated shallow echoes (**ISE**), deep convective cores (**DCC**), wide convective cores (**WCC**), deep-wide convective cores (**DWC**), and broad stratiform rain areas (**BSR**).
  - For all the classifications, the calculations are based on two different sets of thresholds - strong (**str)** and moderate (**mod**). Each object identified by these criteria is provided in netcdf format in both gridded **(grd)** (dimensioned by latitude and longitude) and tabular **(tab)** (dimensioned by instance or case) form. These gridded and tablular netcdf files contain information of the monthly climatology and individual properties of the identified echo objects. So, for example, the broad stratiform data from January of 2015 is contained in 4 files - strong thresholds and gridded, strong thresholds and tabular, moderate thresholds and gridded, and moderate thresholds and tabular.
- **GPM: gpm.atmos.washington.edu**
- **TRMM: trmm.atmos.washington.edu**
- **Must request access from Stacy Brodzik**

Upcoming Impacts

- **Effective with August 2019 data, ECMWF has stopped producing ERA-I reanalysis and will only produce ERA5**
- **GPROF 2A-CLIM data uses ERA-I and effective with September 2019 will be produced using the ERA5.**
  - This will create, until V07, a slight discontinuity between pre and post September 2019 2A-CLIM GPROF products
- **IMERG for the final product also uses ERA-I and it will also have to use ERA5 data**
- **Latency for ERA-I and ERA5 are the same: roughly 3 months**
- **GPROF GPM era 2A products using GANAL will not be affected**
  - No GANAL before 2013
  - All GPROF before 2013 are just 2A-CLIM
  - During GPM era have both GPROF 2A (GANAL based) 2A-CLIM (ERAI/5 based)

Future

- **PPS exploring with JAXA the use of netCDF4 for GPM products due to the commercialization of HDF5**
  - Currently HDF group not supporting HDF5 version 1.8.9 format used by GPM
  - Version 1.10 can be set to be 1.8.9 and the two versions are incompatible
  - Concerned how long the HDF group will continue
  - Will be a public and paid path starting at 1.10 impact of licensing fees on 3rd party tools still unknown
  - Unidata has indicated that regardless of what happens with HDF5, netCDF will always be public
- **Current GPM products can already be read with many netCDF4 tools and with the netCDF4 library functions and utilities.**
- **Suggestion for V07 is just to convert TKIO to use netCDF4 directly and output as a netCDF4 product**
- **Planning for V07 data products has begun**
- **GPM project science has decided to skip V06 for radiometer products that are at V05 and have all data product versions be at V07 at this next reprocessing cycle**